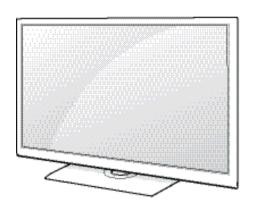# LG
Life's Good

LED LCD TV
SERVICE MANUAL

CHASSIS : LA21B

MODEL : 55LS4600   55LS4600-UA

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.

CONTENTS

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.
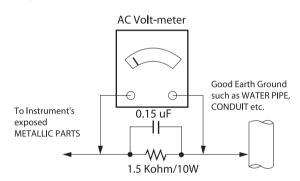
Leakage Current Hot Check circuit

When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This spec sheet is applied LCD TV with LA21B/C chassis

2. Test condition

Each part is tested as below without special notice.

1) Temperature : 25 ℃ ± 5 ℃ (77 ℉ ± 9 ℉), CST : 40 ℃±5 ℃
2) Relative Humidity: 65 % ± 10 %
3) Power Voltage
   : Standard input voltage (AC 110-240 V~, 50/60 Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety : UL, CSA, IEC specification
   - EMC: FCC, ICES, IEC specification

4. General Specification

No	Item		Specification		Remark
1	Receiving System		1) ATSC / NTSC-M		
2	Available Channel		1) VHF : 02~13		
			2) UHF : 14~69		
			3) DTV : 02-69		
			4) CATV : 01~135		
			5) CADTV : 01~135		
3	Input Voltage		1) AC 100 ~ 240V 50/60Hz		Mark : 110V, 60Hz (N.America)
4	Market		NORTH AMERICA		
5	Screen Size		47/55 inch Wide (1920 × 1080)	FHD + 60Hz	
6	Aspect Ratio		16:9		
7	Tuning System		FS		
8	Module	Edge LED	LC550EUE-SEM1 (T120)	LGD	47LS4600-UA
			LC470EUE-SEM1 (T120)	LGD	55LS4600-UA
.9	Operating Environment		1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %		
10	Storage Environment		1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %		

5. Component Video Input (Y, C~B~/P~B~, C~R~/P~R~)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed
1	720*480	15.73	60.00	13.5135	SDTV ,DVD 480I
2	720*480	15.73	59.94	13.50	SDTV ,DVD 480I
3	720*480	31.50	60.00	27.027	SDTV 480P
4	720*480	31.47	59.94	27.00	SDTV 480P
5	1280*720	45.00	60.00	74.25	HDTV 720P
6	1280*720	44.96	59.94	74.176	HDTV 720P
7	1920*1080	33.75	60.00	74.25	HDTV 1080I
8	1920*1080	33.72	59.94	74.176	HDTV 1080I
9	1920*1080	67.50	60.00	148.50	HDTV 1080P
10	1920*1080	67.432	59.94	148.352	HDTV 1080P
11	1920*1080	27.00	24.00	74.25	HDTV 1080P
12	1920*1080	26.97	23.94	74.176	HDTV 1080P
13	1920*1080	33.75	30.00	74.25	HDTV 1080P
14	1920*1080	33.71	29.97	74.176	HDTV 1080P

6. RGB (PC)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	DDC	Remark
1	640*350	31.468	70.09	25.17	EGA	X	
2	720*400	31.469	70.08	28.32	DOS	O	
3	640*480	31.469	59.94	25.17	VESA(VGA)	O	
4	800*600	37.879	60.31	40.00	VESA(SVGA)	O	
5	1024*768	48.363	60.00	65.00	VESA(XGA)	O	
6	1152*864	54.348	60.053		VESA	O	
7	1360*768	47.712	60.015	85.50	VESA (WXGA)	O	
8	1920*1080	66.587	59.934	138.5	WUXGA	O	Full HD model Only

7. HDMI Input

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed		Remarks
	PC (DVI)				DDC		
1	640*350	31.468	70.09	25.17	EGA	X	
2	720*400	31.469	70.08	28.32	DOS	O	
3	640*480	31.469	59.94	25.17	VESA(VGA)	O	
4	800*600	37.879	60.31	40.00	VESA(SVGA)	O	
5	1024*768	48.363	60.00	65.00	VESA(XGA)	O	
6	1152*864	54.348	60.053		VESA	O	
7	1280*1024	63.981	60.020	108.0	VESA (SXGA)	O	Full HD model Only
8	1360*768	47.712	60.015	85.50	VESA (WXGA)	O	
9	1920*1080	67.50	60.00	148.5	HDTV 1080P	O	Full HD model Only
	DTV						
1	720*480	31.47	60.00	27.027	SDTV 480P		
2	720*480	31.47	59.94	27.00	SDTV 480P		
3	1280*720	45.00	60.00	74.25	HDTV 720P		
4	1280*720	44.96	59.94	74.176	HDTV 720P		
5	1920*1080	33.75	60.00	74.25	HDTV 1080I		
6	1920*1080	33.72	59.94	74.176	HDTV 1080I		
7	1920*1080	67.50	60.00	148.50	HDTV 1080P		
8	1920*1080	67.432	59.94	148.352	HDTV 1080P		
9	1920*1080	27.00	24.00	74.25	HDTV 1080P		
10	1920*1080	26.97	23.976	74.176	HDTV 1080P		
11	1920*1080	33.75	30.00	74.25	HDTV 1080P		
12	1920*1080	33.71	29.97	74.176	HDTV 1080P		

8. 3D Mode (LM5800//LM4600/ CM565 models)
8.1. RF 3D Input(DTV)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	37.5	50	74.25	HDTV 720P	Side by Side, Top & Bottom
2	1920*1080	28.125	50	74.25	HDTV 1080I	Side by Side, Top & Bottom

8.2. HDMI Input (V1.4a)

- When connect the cable on TV or change the input mode, 3D display on automatically
- Display OSD information -> 1920x2205 [1080p 24], 1280x1470 [720p 60]

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	89.9 / 90	59.94/60	148.35/148.5	HDTV 720P	Frame packing (720 60p)
2	1280*720	45	60	74.25	HDTV 720P	Side by Side(half), Top & Bottom
3	1920*1080	53.95 / 54	23.98 / 24	148.35/148.5	HDTV 1080P	Frame packing (1080 24p)
4	1920*1080	67.5	60	148.5	HDTV 1080P	Side by Side(half), Top & bottom
5	1920*1080	33.7	60	74.25	HDTV 1080i	Side by Side(half), Top & Bottom
6	1920*1080	27	24	74.25	HDTV 1080P	Side by Side(half), Top & Bottom
7	1920*1080	33.7	30	74.25	HDTV 1080P	Side by Side(half), Top &Bottom

8.3. HDMI Input(1.3)

- Connect the HDMI cable & receiving the HDMI signal
- Press "3D" key of remote control & select 3D format below.

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	45.00	60.00	74.25	HDTV 720P	Side by Side, Top & Bottom
2	1920*1080	33.75	60.00	74.25	HDTV 1080I	Side by Side, Top & Bottom
3	1920*1080	27.00	24.00	74.25	HDTV 1080P	Side by Side, Top & Bottom
4	1920*1080	33.75	30.00	74.25	HDTV 1080P	Side by Side, Top & Bottom
5	1920*1080	67.50	60.00	148.5	HDTV 1080P	Side by Side, Top & Bottom, Single Frame Sequential

8.4. USB Input
(1) Movie

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30	74.25	Side by Side	HDTV 1080P
					Top & Bottom	

(2) MPO Picture 3D : when selecting the MPO file, Automatically 3D on

(3) 3D Demo in store mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	33.75	30.00	74.25	HDTV 1080P	Side by Side

8.5. RGB-PC Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	66.587	59.93	138.625	HDTV 1080P	Side by Side, Top & Bottom

8.6. 3D Input mode

No.	Side by Side	Top & Bottom	Single Frame Sequential	Frame Packing		
1	L R		L	Active video L / Active space / Active video R		

8.7. DLNA

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1	1920*1080	33.75	30	74.25	HDTV 1080P	Side by Side, Top & Bottom

ADJUSTMENT INSTRUCTION

1. Application Range

This spec. sheet applies to LA21B/C Chassis applied LCD TV all models manufactured in TV factory.

2. Specification

(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
(2) Adjustment must be done in the correct order.
(3) The adjustment must be performed in the circumstance of 25 ±5 °C of temperature and 65±10% of relative humidity if there is no specific designation.
(4) The input voltage of the receiver must keep 100~240V, 50/60Hz.
(5) At first Worker must turn on the SET by using Power Only key.
(6) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15 °C
In case of keeping module is in the circumstance of 0°C, it should be placed in the circumstance of above 15°C for 2 hours
In case of keeping module is in the circumstance of below -20°C, it should be placed in the circumstance of above 15°C for 3 hours.

[Caution]
When still image is displayed for a period of 20 minutes or longer (especially where W/B scale is strong.
Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area

3. Adjustment items

3.1. Main PCBA Adjustments

(1) ADC adjustment: Component 480i, 1080p / RGB-PC 1080p
(2) EDID download: HDMI and RGB-PC

● Above adjustment items can be also performed in Final Assembly if needed. Both Board-level and Final assembly adjustment items can be check using In-Start Menu (1. Adjust Check). Component 1080p and RGB-PC Adjust will be calculated by 480i adjust value.

3.2. Final assembly adjustment

(1) White Balance adjustment
(2) RS-232C functionality check
(3) Factory Option setting per destination
(4) Shipment mode setting (In-Stop)
(5) GND and HI-POT test

3.3. Appendix

(1) Shipment conditions
(2) Tool option menu
(3) USB Download (S/W Update, Option and Service only)
(4) Preset CH Information

4. MAIN PCBA Adjustments

4.1. ADC Adjustment

4.1.1. Overview

▪ ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.

4.1.2. Equipment & Condition

(1) Protocol: RS-232C
(2) Inner Pattern
- Resolution : 1080p(Comp) / 1024*768(RGB)
- Pattern : Horizontal 100% Color Bar Pattern
- Pattern level : 0.7±0.1 Vp-p

4.1.3. Adjustment

4.1.3.1. Adjustment method
- Connect to Jig by using RS-232, adjust Component and RGB

● Manual adj (If needed in Final Assembly)
- Required equipment : Adjustment R/C
- Enter Service Mode by pushing "ADJ" key,
- Enter Internal ADC mode by pushing '►' key at [6. ADC Calibration]

4.1.3.2. Adj. protocol
- Connect to Jig by using RS-232, adjust Component and RGB

Protocol	CMD 1	CMD 2	Data 1	Data 2	Remark
Enter adj mode	a	a	00	00	When transfer the 'Mode In',Carry the command.
Start ADC adj	a	d	00	10	Automatically adjustment (Use internal pattern)

4.2. EDID Download

4.2.1. Overview

- It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

4.2.2. Equipment

(1) Since EDID data is embedded, EDID download JIG, HDMI cable and D-sub cable are not need.
(2) Adjust by using remote controller.

4.2.3. Download method

(1) Press Adj. key on the Adj. R/C.
(2) Select EDID D/L menu.
(3) By pressing Enter key, EDID download will begin
(4) If Download is successful, OK is display, but If Download is failure, NG is displayed.
(5) If Download is failure, Re-try downloads.
[Caution] : When EDID Download, must remove RGB/HDMI Cable.

4.2.4. EDID DATA

4.2.4.1. North America (PCM)
(1) FHD Model - 8Bit

■ HDMI 1-FHD-8BIT (C/S : E9CF)
EDID Block 0, Bytes 0-127 [00H-7FH]

```
         0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
   -------------------------------------------------------------------
 0 | 00 FF FF FF FF FF FF 00 1E 6D 01 00 01 01 01 01
10 | 01 16 01 03 80 A0 5A 78 0A EE 91 A3 54 4C 99 26
20 | 0F 50 54 A1 08 00 31 40 45 40 61 40 71 40 81 80
30 | 01 01 01 01 01 01 02 3A 80 18 71 38 2D 40 58 2C
40 | 45 00 40 84 63 00 00 1E 66 21 50 B0 51 00 1B 30
50 | 40 70 36 00 40 84 63 00 00 1E 00 00 00 FD 00 3A
60 | 3E 1E 53 10 00 0A 20 20 20 20 20 20 00 00 00 FC
70 | 00 4C 47 20 54 56 0A 20 20 20 20 20 20 01 E9
```

EDID Block 1, Bytes 128-255 [80H-FFH]

```
         0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
   -------------------------------------------------------------------
 0 | 02 03 19 F1 48 90 22 20 05 04 03 02 01 23 09 57
10 | 07 67 03 0C 00 10 00 80 1E 02 3A 80 18 71 38 2D
20 | 40 58 2C 04 05 40 84 63 00 00 1E 01 1D 80 18 71
30 | 1C 16 20 58 2C 25 00 40 84 63 00 00 9E 01 1D 00
40 | 72 51 D0 1E 20 6E 28 55 00 40 84 63 00 00 1E 8C
50 | 0A D0 8A 20 E0 2D 10 10 3E 96 00 40 84 63 00 00
60 | 18 26 36 80 A0 70 38 1F 40 30 20 25 00 40 84 63
70 | 00 00 1A 00 00 00 00 00 00 00 00 00 00 00 00 CF
```

■ HDMI 2-FHD-8BIT (C/S : E9BF)
EDID Block 0, Bytes 0-127 [00H-7FH]

```
         0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
   -------------------------------------------------------------------
 0 | 00 FF FF FF FF FF FF 00 1E 6D 01 00 01 01 01 01
10 | 01 16 01 03 80 A0 5A 78 0A EE 91 A3 54 4C 99 26
20 | 0F 50 54 A1 08 00 31 40 45 40 61 40 71 40 81 80
30 | 01 01 01 01 01 01 02 3A 80 18 71 38 2D 40 58 2C
40 | 45 00 40 84 63 00 00 1E 66 21 50 B0 51 00 1B 30
50 | 40 70 36 00 40 84 63 00 00 1E 00 00 00 FD 00 3A
60 | 3E 1E 53 10 00 0A 20 20 20 20 20 20 00 00 00 FC
70 | 00 4C 47 20 54 56 0A 20 20 20 20 20 20 01 E9
```

EDID Block 1, Bytes 128-255 [80H-FFH]

```
         0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
   -------------------------------------------------------------------
 0 | 02 03 19 F1 48 90 22 20 05 04 03 02 01 23 09 57
10 | 07 67 03 0C 00 20 00 80 1E 02 3A 80 18 71 38 2D
20 | 40 58 2C 04 05 40 84 63 00 00 1E 01 1D 80 18 71
30 | 1C 16 20 58 2C 25 00 40 84 63 00 00 9E 01 1D 00
40 | 72 51 D0 1E 20 6E 28 55 00 40 84 63 00 00 1E 8C
50 | 0A D0 8A 20 E0 2D 10 10 3E 96 00 40 84 63 00 00
60 | 18 26 36 80 A0 70 38 1F 40 30 20 25 00 40 84 63
70 | 00 00 1A 00 00 00 00 00 00 00 00 00 00 00 00 BF
```

■ HDMI 3-FHD-8BIT (C/S : E9AF)
EDID Block 0, Bytes 0-127 [00H-7FH]

```
         0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
   -------------------------------------------------------------------
 0 | 00 FF FF FF FF FF FF 00 1E 6D 01 00 01 01 01 01
10 | 01 16 01 03 80 A0 5A 78 0A EE 91 A3 54 4C 99 26
20 | 0F 50 54 A1 08 00 31 40 45 40 61 40 71 40 81 80
30 | 01 01 01 01 01 01 02 3A 80 18 71 38 2D 40 58 2C
40 | 45 00 40 84 63 00 00 1E 66 21 50 B0 51 00 1B 30
50 | 40 70 36 00 40 84 63 00 00 1E 00 00 00 FD 00 3A
60 | 3E 1E 53 10 00 0A 20 20 20 20 20 20 00 00 00 FC
70 | 00 4C 47 20 54 56 0A 20 20 20 20 20 20 01 E9
```

EDID Block 1, Bytes 128-255 [80H-FFH]

```
         0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
   -------------------------------------------------------------------
 0 | 02 03 19 F1 48 90 22 20 05 04 03 02 01 23 09 57
10 | 07 67 03 0C 00 30 00 80 1E 02 3A 80 18 71 38 2D
20 | 40 58 2C 04 05 40 84 63 00 00 1E 01 1D 80 18 71
30 | 1C 16 20 58 2C 25 00 40 84 63 00 00 9E 01 1D 00
40 | 72 51 D0 1E 20 6E 28 55 00 40 84 63 00 00 1E 8C
50 | 0A D0 8A 20 E0 2D 10 10 3E 96 00 40 84 63 00 00
60 | 18 26 36 80 A0 70 38 1F 40 30 20 25 00 40 84 63
70 | 00 00 1A 00 00 00 00 00 00 00 00 00 00 00 00 AF
```

■ RGB-FHD (C/S : 02)
EDID Block 0, Bytes 0-127 [00H-7FH]

```
         0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
   -------------------------------------------------------------------
 0 | 00 FF FF FF FF FF FF 00 1E 6D 01 00 01 01 01 01
10 | 01 16 01 03 68 A0 5A 78 0A EE 91 A3 54 4C 99 26
20 | 0F 50 54 A1 08 00 31 40 45 40 61 40 71 40 81 80
30 | 01 01 01 01 01 01 02 3A 80 18 71 38 2D 40 58 2C
40 | 45 00 40 84 63 00 00 1E 66 21 50 B0 51 00 1B 30
50 | 40 70 36 00 40 84 63 00 00 1E 00 00 00 FD 00 3A
60 | 3E 1E 53 10 00 0A 20 20 20 20 20 20 00 00 00 FC
70 | 00 4C 47 20 54 56 0A 20 20 20 20 20 20 00 02
```

5. Final Assembly Adjustment

5.1. White Balance Adjustment

5.1.1. Overview

5.1.1.1. W/B adj. Objective & How-it-works
  (1) Objective: To reduce each Panel's W/B deviation
  (2) How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
  (3) Adj. condition: normal temperature
  - Surrounding Temperature: 25±5 ℃
  - Warm-up time: About 5 Min
  - Surrounding Humidity: 20% ~ 80%
  - Before White balance adjustment, Keep power on status, don't power off
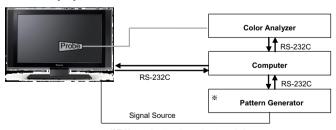
5.1.1.2. Adj. condition and cautionary items
  (1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
  (2) Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
  (3) Aging time
  - After Aging Start, Keep the Power ON status during 5 Minutes.
  - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

5.1.2. Equipment

  (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
  (2) Adj. Computer(During auto adj., RS-232C protocol is needed)
  (3) Adjust Remocon
  (4) Video Signal Generator MSPG-925F 720p/204-Gray (Model:217, Pattern:49)
    → Only when internal pattern is not available
    ※ Color Analyzer Matrix should be calibrated using CS-1000

5.1.3. Equipment connection

※If TV internal pattern is used, not needed

5.1.4. Adjustment Command (Protocol)

(1) RS-232C Command used during auto-adj

RS-232C COMMAND			Explanation
CMD	DATA	ID	
Wb	00	00	Begin White Balance adj.
Wb	00	ff	End White Balance adj. (internal pattern disappears)

(2) Adjustment Map

	Adj. item	Command (lower case ASCII)		Data Range (Hex.)	Default (Decimal)
		CMD1	CMD2	MIN	MAX
Cool	R Gain	j	g	00	C0
	G Gain	j	h	00	C0
	B Gain	j	i	00	C0
	R Cut				
	G Cut				
	B Cut				
Medium	R Gain	j	a	00	C0
	G Gain	j	b	00	C0
	B Gain	j	c	00	C0
	R Cut				
	G Cut				
	B Cut				
Warm	R Gain	j	d	00	C0
	G Gain	j	e	00	C0
	B Gain	j	f	00	C0
	R Cut				
	G Cut				

5.1.5. Adjustment method

5.1.5.1. Auto WB calibration
(1) Set TV in ADJ mode using P-ONLY key (or POWER ON key)
(2) Place optical probe on the center of the display
   - It need to check probe condition of zero calibration before adjustment.
(3) Connect RS-232C Cable
(4) Select mode in ADJ Program and begin a adjustment.
(5) When WB adjustment is completed with OK message, check adjustment status of pre-set mode (Cool, Medium, Warm)
(6) Remove probe and RS-232C cable.
※ W/B Adj. must begin as start command "wb 00 00" , and finish as end command "wb 00 ff", and Adj. offset if need.

5.1.5.2. Manual adj. method
(1) Set TV in Adj. mode using POWER ON
(2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface..
(3) Press ADJ key -> EZ adjust using adj. R/C -> 6. White-Balance then press the cursor to the right (KEY►).
(When KEY(►) is pressed 204 Gray(80IRE) internal pattern will be displayed)
(4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
(5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

5.1.6. Reference (White Balance Adj. coordinate and color temperature)

▪ Luminance: 204 Gray, 80IRE
** Lamp Module
▪ Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Coordinate		Temp	△uv
	X	Y		
Cool	0.269	0.273	13,000K	0.0000
Medium	0.285	0.293	9,300K	0.0000
Warm	0.313	0.329	6,500K	0.0000

▪ Standard color coordinate and temperature using CA-210(CH 14)

Mode	Coordinate		Temp	△uv
	X	Y		
Cool	0.269±0.002	0.273±0.002	13,000K	0.0000
Medium	0.285±0.002	0.293±0.002	9,300K	0.0000
Warm	0.313±0.002	0.329±0.002	6,500K	0.0000

** Only Edge-LED OS(AUO,CMI,IPS,Sharp) Module except AUO 65"
▪ Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Coordinate		Temp	△uv
	X	Y		
Cool	0.271	0.276	13,000K	0.0000
Medium	0.287	0.296	9,300K	0.0000
Warm	0.315	0.332	6,500K	0.0000

▪ Standard color coordinate and temperature using CA-210(CH 14)

Mode	Coordinate		Temp	△uv
	X	Y		
Cool	0.271±0.002	0.276±0.002	13,000K	0.0000
Medium	0.287±0.002	0.296±0.002	9,300K	0.0000
Warm	0.315±0.002	0.332±0.002	6,500K	0.0000

** Only Edge-LED LGD Module
▪ Standard color coordinate and temperature using CA-210(CH-14) – by aging time

GP3	Aging time (Min)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		269	273	285	293	313	329
1	0-2	280	287	296	307	320	337
2	3-5	279	286	295	305	319	335
3	6-9	277	284	292	304	317	334
4	10-19	276	283	292	303	316	333
5	20-35	274	280	290	300	314	330
6	36-49	272	277	288	297	312	327
7	50-79	271	275	287	295	311	325
8	80-149	270	274	286	294	310	324
9	Over 150	269	273	285	293	309	323

5.2. Option selection per country

5.2.1. Overview
(1) Tool option selection is only done for models in Non-USA North America due to rating
(2) Applied model: LA02D and LA02E Chassis applied to CANADA and MEXICO

5.2.2. Country Group selection
(1) Press ADJ key on the Adj. R/C, and then select Country Group Menu
(2) Depending on destination, select KR or US, then on the lower Country option, select US, CA, MX.
Selection is done using +, - KEY

5.2.3. Tool Option inspection
▪ Press Adj. key on the Adj. R/C, then select Tool option.

Model	Module	Tool 1	Tool 2	Tool 3	Tool 4	Tool 5
47LM4600-UA	LGD	32855	2423	10523	29612	7170
55LM4600-UA	LGD	32857	2423	11547	29612	7170
32LS5600-UA	LGD	16725	2423	10523	29612	7202
37LS5600-UC	LGD	16725	2423	9499	29612	7202
47LS5600-UC	AUO	20823	2423	9499	29612	7218
55LS5600-UC	LGD	20825	2423	9499	29612	7170
55LS5600-UC	AUO	20825	2423	9499	29612	7218

6. GND and HI-POT Test

6.1. GND & HI-POT auto-check preparation
(1) Check the POWER CABLE and SIGNAL CABE insertion condition

6.2. GND & HI-POT auto-check
(1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
(2) Connect the AV JACK Tester.
(3) Controller (GWS103-4) on.
(4) GND Test (Auto)
- If Test is failed, Buzzer operates.
- If Test is passed, execute next process (Hi-pot test).
  (Remove A/V CORD from A/V JACK BOX)
(5) HI-POT test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, GOOD Lamp on and move to next process automatically.

6.3. Checkpoint
(1) Test voltage
- GND: 1.5KV/min at 100mA
- SIGNAL: 3KV/min at 100mA
(2) TEST time: 1 second
(3) TEST POINT
- GND Test = POWER CORD GND and SIGNAL CABLE GND.
- Hi-pot Test = POWER CORD GND and LIVE & NEUTRAL.
(4) LEAKAGE CURRENT: At 0.5mArms

7. AUDIO output check

7.1. Audio input condition
(1) RF input: Mono, 1KHz sine wave signal, 100% Modulation
(2) CVBS, Component: 1KHz sine wave signal (0.4Vrms)
(3) RGB PC: 1KHz sine wave signal (0.7Vrms)
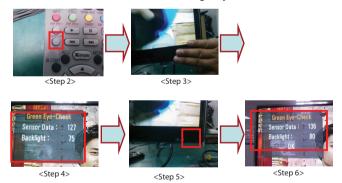
7.2. Specification

No	Item	Min	Typ	Max	Unit	Remark
1	Audio practical max Output, L/R	9.0 8.5	10.0 8.9	12.0 9.9	W Vrms	(1) Measurement condition - EQ/AVL/Clear Voice: Off (2) Speaker (8Ω Impedance)

8. EYE-Q Check
Step 1) Turn on the TV..
Step 2) Press 'EYE button' on the adjustment remote-controller.
Step 3) Cover 'Eye Q sensor' on the front of set with your hands, hold it for 6 seconds.
Step 4) Check "the Sensor Data" on the screen, make certain that Data is below 10. If Data isn't below 10 in 6 seconds, Eye Q sensor would be bad. You should change Eye Q sensor.
Step 5) Uncover your hands from Eye Q sensor, hold it for 6 seconds.
Step 6) Check "Back Light(xxx)" on the screen, check data increase . You should change Eye Q sensor.

<Step 2>   <Step 3>

<Step 4>   <Step 5>   <Step 6>

9. USB S/W Download
(optional, Service only)

(1) Put the USB Stick to the USB socket

(2) Automatically detecting update file in USB Stick
  - If your downloaded program version in USB Stick is lower than that of TV set, it didn't work. Otherwise USB data is automatically detected.

(3) Show the message "Copying files from memory"
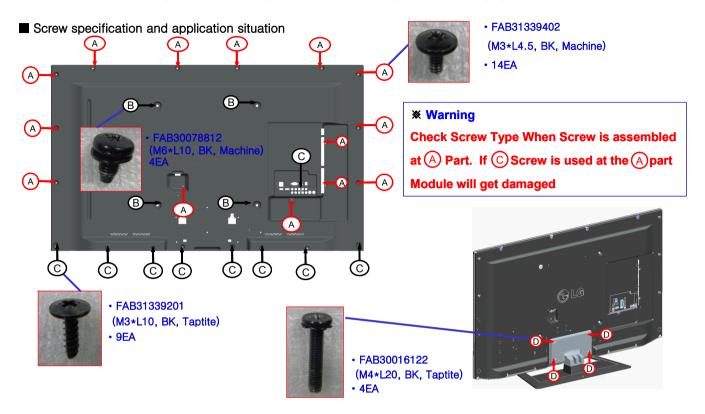
(4) Updating is staring.
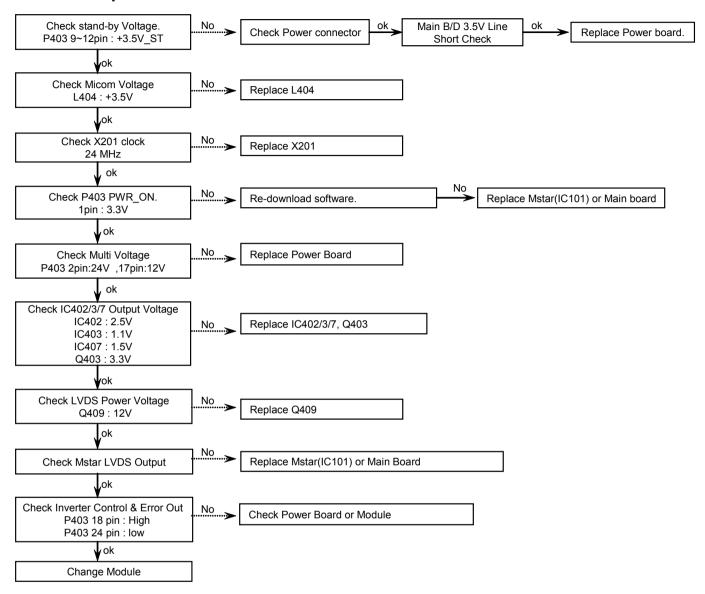
(5) Updating Completed, The TV will restart automatically

(6) If your TV is turned on, check your updated version and Tool option.

* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. If all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, TOOL OPTION setting is needed again.

(1) Push "IN-START" key in service remote controller.

(2) Select "Tool Option 1" and Push "OK" button.

(3) Punch in the number. (Each model has their number.)

SCREW ASSEMBLY WORKING GUIDE

■ Screw specification and application situation

- FAB31339402
  (M3*L4.5, BK, Machine)
- 14EA

- FAB30078812
  (M6*L10, BK, Machine)
  4EA

※ **Warning**

Check Screw Type When Screw is assembled at Ⓐ Part. If Ⓒ Screw is used at the Ⓐ part Module will get damaged

- FAB31339201
  (M3*L10, BK, Taptite)
- 9EA

- FAB30016122
  (M4*L20, BK, Taptite)
- 4EA

TROUBLE SHOOTING

1. Power-up boot check

```
Check stand-by Voltage.          No      Check Power connector   ok   Main B/D 3.5V Line    ok   Replace Power board.
P403 9~12pin : +3.5V_ST    ┄┄┄>                              ───>   Short Check          ───>
        │ ok
        v
Check Micom Voltage              No      Replace L404
L404 : +3.5V               ┄┄┄>
        │ ok
        v
Check X201 clock                 No      Replace X201
24 MHz                     ┄┄┄>
        │ ok
        v
Check P403 PWR_ON.               No      Re-download software.         No    Replace Mstar(IC101) or Main board
1pin : 3.3V                ┄┄┄>                                  ───>
        │ ok
        v
Check Multi Voltage              No      Replace Power Board
P403 2pin:24V ,17pin:12V   ┄┄┄>
        │ ok
        v
Check IC402/3/7 Output Voltage
IC402 : 2.5V                     No      Replace IC402/3/7, Q403
IC403 : 1.1V               ┄┄┄>
IC407 : 1.5V
Q403 : 3.3V
        │ ok
        v
Check LVDS Power Voltage         No      Replace Q409
Q409 : 12V                 ┄┄┄>
        │ ok
        v
Check Mstar LVDS Output          No      Replace Mstar(IC101) or Main Board
                           ┄┄┄>
        │ ok
        v
Check Inverter Control & Error Out   No    Check Power Board or Module
P403 18 pin : High           ┄┄┄>
P403 24 pin : low
        │ ok
        v
Change Module
```

2. Digital TV Video

```
┌─────────────────────────────┐
│   Check RF Cable & Signal   │
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌──────────────────────────┐
│   Check Tuner 3.3V Power    │ ············>  │      Replace L3703        │
│           L3703             │                └──────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌──────────────────────────┐
│   Check Tuner 1.8V Power    │ ············>  │      Replace IC3703       │
│      IC3703  2 pin : 1.8V   │                └──────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌──────────────────────────┐
│     Check IF_P/N Signal     │ ············>  │  Bad Tuner. Replace Tuner.│
│     TU3704 10/11 Pin        │                └──────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌────────────────────────────────────┐
│   Check Mstar LVDS Output   │ ············>  │ Replace Mstar(IC101) or Main Board.│
└─────────────────────────────┘                └────────────────────────────────────┘
```

3. Analog TV Video

```
┌─────────────────────────────┐
│   Check RF Cable & Signal   │
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌──────────────────────────┐
│   Check Tuner 3.3V Power    │ ············>  │      Replace L3703        │
│           L3703             │                └──────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌──────────────────────────┐
│   Check Tuner 1.8V Power    │ ············>  │      Replace IC3703 .     │
│      IC3703 2 pin : 1.8V    │                └──────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌──────────────────────────┐
│      Check CVBS Signal      │ ············>  │  Bad Tuner. Replace Tuner.│
│        TU3704 8 Pin         │                └──────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐        No      ┌────────────────────────────────────┐
│   Check Mstar LVDS Output   │ ············>  │ Replace Mstar(IC101) or Main Board.│
└─────────────────────────────┘                └────────────────────────────────────┘
```

4. AV Video

```
┌─────────────────────────────┐
│   Check input signal format.│
│      Is it supported?        │
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐
│   Check AV Cable for damage  │
│   for damage or open conductor│
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐     No    ┌─────────────────────────┐
│  Check JK1601, CVBS Signal Line├ ─ ─ ─ ─ ▶│      Replace Jack        │
│            L1603             │           └─────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐     No    ┌─────────────────────────┐
│    Check CVBS_DET Signal     ├ ─ ─ ─ ─ ▶│      Replace R1600       │
└─────────────────────────────┘           └─────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐     No    ┌──────────────────────────────────┐
│   Check Mstar LVDS Output    ├ ─ ─ ─ ─ ▶│ Replace Mstar(IC101) or Main Board.│
└─────────────────────────────┘           └──────────────────────────────────┘
```

5. Component Video

```
┌─────────────────────────────┐
│   Check input signal format.│
│      Is it supported?        │
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐
│   Check Component Cable      │
│  for damage or open conductor.│
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐     No    ┌─────────────────────────┐
│ Check JK1603 or JK1602 or JK1601├ ─ ─ ─ ▶│      Replace Jack        │
│       Y/PB/PR signal Line    │           └─────────────────────────┘
└─────────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐     No    ┌─────────────────────────┐
│    Check COMP_DET Signal     ├ ─ ─ ─ ─ ▶│  Replace R1612 or R1613  │
└─────────────────────────────┘           └─────────────────────────┘
              │ ok
              ▼
┌─────────────────────────────┐     No    ┌──────────────────────────────────┐
│   Check Mstar LVDS Output    ├ ─ ─ ─ ─ ▶│ Replace Mstar(IC101) or Main Board.│
└─────────────────────────────┘           └──────────────────────────────────┘
```

6. RGB Video

```
┌─────────────────────────┐
│  Check input signal format. │
│      Is it supported?       │
└─────────────────────────┘
            │ ok
            ▼
┌─────────────────────────┐
│   Check RGB Cable conductors │
│  for damage or open conductor │
└─────────────────────────┘
            │ ok
            ▼
┌─────────────────────────┐                    ┌──────────────────────────────────────────────────┐
│       Check EDID          │ ....No.......▶  │ re-download EDID data ,Replace Mstar(IC101) or Main Board │
│       I2C Signal          │                    └──────────────────────────────────────────────────┘
│  R1138, R1139(SDA,SCL)    │
└─────────────────────────┘
            │ ok
            ▼
┌─────────────────────────┐                    ┌──────────────────────────┐
│       Check JK1104        │ ....No.......▶  │       Replace Jack        │
│ H/V_Sync/R/G/B Signal Line │                    └──────────────────────────┘
└─────────────────────────┘
            │ ok
            ▼
┌─────────────────────────┐                    ┌──────────────────────────┐
│     Check DSUB_DET        │ ....No.......▶  │   Replace R1146 or R1147  │
└─────────────────────────┘                    └──────────────────────────┘
            │ ok
            ▼
┌─────────────────────────┐                    ┌──────────────────────────────────┐
│   Check Mstar LVDS Output  │ ....No.......▶  │ Replace Mstar(IC101) or Main Board. │
└─────────────────────────┘                    └──────────────────────────────────┘
```

7. HDMI Video

```
┌─────────────────────────┐
│   Check input signal format. │
│      Is it supported?       │
└─────────────────────────┘
             │ ok
             ▼
┌─────────────────────────┐
│   Check HDMI Cable conductors │
│   for damage or open conductor. │
└─────────────────────────┘
             │ ok
             ▼
┌─────────────────────────┐     No    ┌─────────────────────────────────────────┐
│      Check EDID         │ ········▶ │ Replace the defective IC or re-download EDID data │
│   R884,R8 I2C Signal    │          └─────────────────────────────────────────┘
└─────────────────────────┘
             │ ok
             ▼
┌─────────────────────────┐     No    ┌─────────────────────┐
│  Check JK801, JK802, JK803 │ ······▶ │     Replace Jack     │
└─────────────────────────┘          └─────────────────────┘
             │ ok
             ▼
┌─────────────────────────┐     No    ┌─────────────────────┐
│   Check HDMI_DET(HPD)   │ ········▶ │ Replace R830,R828,R862 │
└─────────────────────────┘          └─────────────────────┘
             │ ok
             ▼
┌─────────────────────────┐     No    ┌─────────────────────┐
│  Check HDCP EEPROM(IC103) │ ·····▶  │ Replace the defective IC. │
│     Power & I2C Signal   │          └─────────────────────┘
└─────────────────────────┘
             │ ok
             ▼
┌─────────────────────────┐     No    ┌─────────────────────┐   No   ┌─────────────────────┐
│    Check HDMI Signal    │ ········▶ │   Check other set   │ ·····▶ │  Replace Main Board  │
│                         │          │ If no problem, check signal line │        └─────────────────────┘
└─────────────────────────┘          └─────────────────────┘
             │ ok
             ▼
┌─────────────────────────┐     No    ┌──────────────────────────────┐
│  Check Mstar LVDS Output │ ·······▶ │ Replace Mstar(IC101) or Main Board. │
└─────────────────────────┘          └──────────────────────────────┘
```

8. All Source Audio

Check the TV Speaker Menu (Menu -> Sound -> TV Speaker)	····Off····>	Toggle the Menu

↓On

Check AMP IC(IC501) Power 24V, 3.3V	····No····>	Replace Amp IC(IC501)

↓ok

Check Mstar AUDIO_MASTER_CLK R148	····No····>	Replace Mstar(IC101) or Main Board.

↓ok

Check AMP I2C Line R140, R141	····No····>	Check signal line. Or replace Mstar(IC101)

↓ok

Check Mstar I2S Output IC501 9,10,11 Pin	····No····>	Check signal line. Or replace Mstar(IC101)

↓ok

Check Output Signal P501 1, 2, 3, 4 pin.	····No····>	Replace Audio AMP IC(IC501)

↓ok

Check Connector & P501	····No····>	Replace connector if found to be damaged.

↓ok

Check speaker resistance and connector damage.	····No····>	Replace speaker.

9. Digital TV Audio

```
┌─────────────────────────────┐
│   Check RF Cable & Signal   │
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐      No     ┌──────────────────────────┐
│   Check Tuner 3.3V Power    │ ┈┈┈┈┈┈┈┈┈> │     Replace L3703         │
│           L3703             │             └──────────────────────────┘
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐      No     ┌──────────────────────────┐
│   Check Tuner 1.8V Power    │ ┈┈┈┈┈┈┈┈┈> │     Replace IC3703        │
│     IC3703  2 pin : 1.8V    │             └──────────────────────────┘
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐      No     ┌──────────────────────────┐
│     Check IF_P/N Signal     │ ┈┈┈┈┈┈┈┈┈> │  Bad Tuner. Replace Tuner.│
│     TU3700  10/11 Pin       │             └──────────────────────────┘
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐
│     Follow procedure        │
│    '8. All source audio'    │
│   trouble shooting guide.   │
└─────────────────────────────┘
```

10. Analog TV Audio

```
┌─────────────────────────────┐
│   Check RF Cable & Signal   │
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐      No     ┌──────────────────────────┐
│   Check Tuner 3.3V Power    │ ┈┈┈┈┈┈┈┈┈> │     Replace L3703         │
│           L3703             │             └──────────────────────────┘
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐      No     ┌──────────────────────────┐
│   Check Tuner 1.8V Power    │ ┈┈┈┈┈┈┈┈┈> │    Replace IC3703 .       │
│     IC3703 2 pin : 1.8V     │             └──────────────────────────┘
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐      No     ┌──────────────────────────┐
│     Check CVBS Signal       │ ┈┈┈┈┈┈┈┈┈> │  Bad Tuner. Replace Tuner.│
│       TU3700 8 Pin          │             └──────────────────────────┘
└─────────────────────────────┘
          │ ok
          ▼
┌─────────────────────────────┐
│     Follow procedure        │
│    '8. All source audio'    │
│   trouble shooting guide.   │
└─────────────────────────────┘
```

11. AV Audio

```
┌─────────────────────────────┐
│   Check AV Cable for damage  │
│  for damage or open conductor│
└─────────────────────────────┘
             │ ok
             ▼
┌─────────────────────────────┐    No    ┌──────────────────────┐
│    Check JK1601 Signal Line  │·········▶│    Replace Jack      │
│        R1632,R1633           │          └──────────────────────┘
└─────────────────────────────┘
             │ ok
             ▼
┌─────────────────────────────┐
│      Follow procedure        │
│     '8. All source audio'    │
│    trouble shooting guide.   │
└─────────────────────────────┘
```

12. Component Audio

```
┌─────────────────────────────┐
│   Check Component Cable      │
│  for damage or open conductor.│
└─────────────────────────────┘
             │ ok
             ▼
┌─────────────────────────────┐    No    ┌──────────────────────┐
│    Check JK1601 Signal Line  │·········▶│    Replace Jack      │
│        R1618, R1617          │          └──────────────────────┘
└─────────────────────────────┘
             │ ok
             ▼
┌─────────────────────────────┐
│      Follow procedure        │
│     '8. All source audio'    │
│    trouble shooting guide.   │
└─────────────────────────────┘
```

13. RGB Audio

```
┌─────────────────────────────┐
│    Check Cable conductors    │
│  for damage or open conductor│
└─────────────────────────────┘
             │ ok
             ▼
┌─────────────────────────────┐    No    ┌──────────────────────┐
│   Check JK1102 & Signal Line │·········▶│    Replace Jack      │
└─────────────────────────────┘          └──────────────────────┘
             │ ok
             ▼
┌─────────────────────────────┐
│      Follow procedure        │
│     '8. All source audio'    │
│    trouble shooting guide.   │
└─────────────────────────────┘
```

BLOCK DIAGRAM

EXPLODED VIEW

* Set + Stand
* Stand Base + Body

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | GP4L_S7LR2 | DATE | 2011.11.16 |
| BLOCK | FLASH/EEPROM/GPIO | SHEET | 1 |

MODEL OPTION

PIN NAME	PIN NO.	LOW	HIGH
MODEL_OPT_0	AB3	FHD	HD
MODEL_OPT_1	F4	PHM_OFF	PHM_ON
MODEL_OPT_2	AB2	NON_DVB_T2	DVB_T2
MODEL_OPT_3	T25	NON_3D	3D
MODEL_OPT_4	U23	NON_OLED	OLED
MODEL_OPT_5	T24	NON_DVB_S	DVB_S
MODEL_OPT_6	B8	NON_120HZ	120HZ
MODEL_OPT_7	A8	READY	READY

VDDC 1.05V

Normal Power 3.3V

Normal 2.5V

DDR3 1.5V

STby 3.5V

IC101
LGE2111A-T8
S7LR2_DIVX_MS10

ANALOG SIF
Close to MSTAR

TUNER_I2C

SIDE USB

I2S I/F

AUDIO IN

AUDIO OUT

H/P OUT

SOC_RESET

'H/W opt : ETHERNET'

THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR
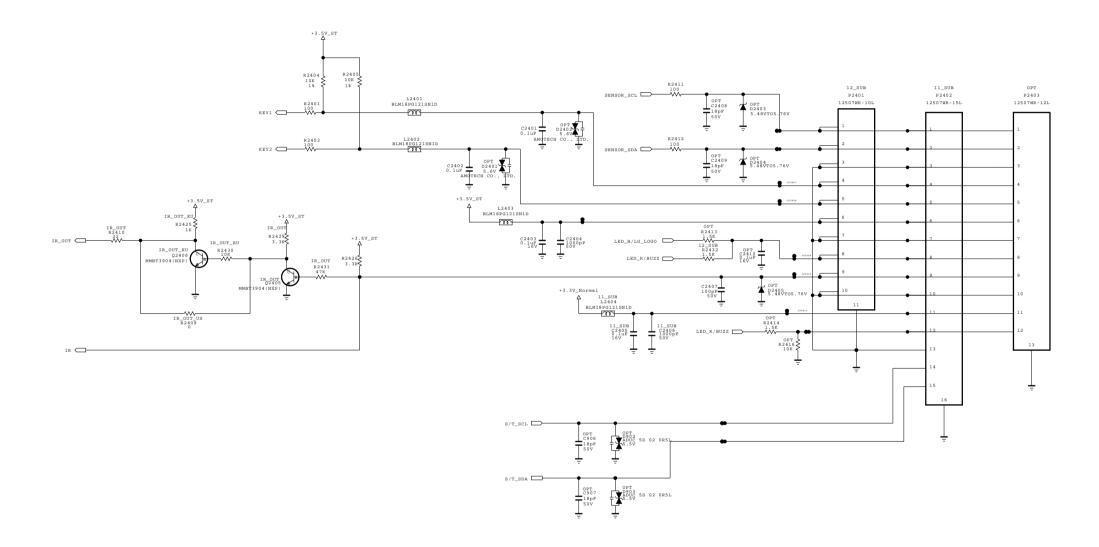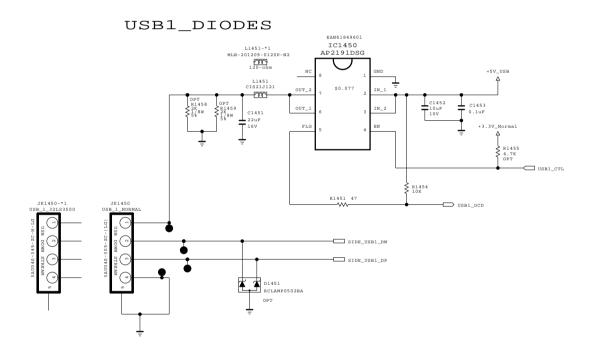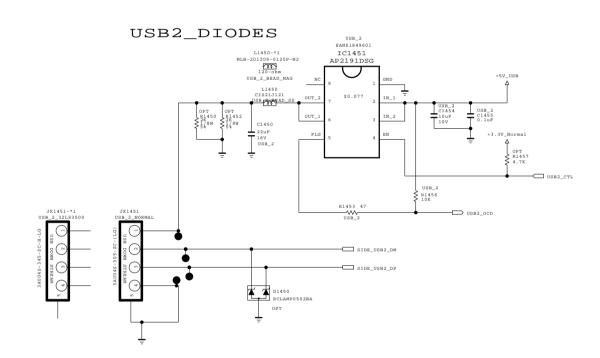THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011.07.12
BLOCK	POWER,IN/OUT,H/W OPT	SHEET	2

TP for NON-EU models(except EU and China)

TP for CI slot

/PCM_REG
/PCM_OE
/PCM_WE
/PCM_IORD
/PCM_IOWR
/PCM_CE
/PCM_IRQA
/PCM_CD
/PCM_WAIT
PCM_RST
/CI_CD1
/CI_CD2
PCM_5V_CTL
CI_DET

PCM_D[0]
PCM_D[1]
PCM_D[2]
PCM_D[3]
PCM_D[4]
PCM_D[5]
PCM_D[6]
PCM_D[7]

PCM_A[8]
PCM_A[9]
PCM_A[10]
PCM_A[11]
PCM_A[12]
PCM_A[13]
PCM_A[14]

CI_TS_CLK
CI_TS_VAL
CI_TS_SYNC
CI_TS_DATA[0]
CI_TS_DATA[1]
CI_TS_DATA[2]
CI_TS_DATA[3]
CI_TS_DATA[4]
CI_TS_DATA[5]
CI_TS_DATA[6]
CI_TS_DATA[7]

TP for SCART

SCART1_MUTE
SC1_ID
SC1_FB
SC1_SOG_IN
DTV/MNT_VOUT
SCART1_Lout
SCART1_Rout
SC1_CVBS_IN

TP for Headphone

HP_LOUT
HP_ROUT
SIDE_HP_MUTE
HP_DET

TP for S2

S2_RESET

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4_S7LR2	DATE	2011.07.07
BLOCK	TP_NON_EN	SHEET	3

FROM LIPS & POWER B/D

'ERROR_OUT' is used for
lamp(CCFL/EEFL) models.
In other words,
LED models need not use.

PANEL_POWER

Power_DET

ST_3.5V--> 3.375V --> 3.46V
20V-->3.51V --> 3.76V (3.59V)
24V-->3.78V --> 3.92V (3.79V)
12V -->3.86V --> 3.82V (3.68V)
18.5V-->3.5V --> 3.75V (3.59V)

+1.5V_DDR

Max 1000mA

IC407
AP7173-SPG-13 HF(DIODES)
[EP]

1.5A

Vout=0.8*(1+R1/R2)=1.5319

+3.3V_Normal

780 mA

+2.5V/+1.8V

IC402
TJ3940B-2.5V-3L

300 mA

FOR LPB Download
[To LED DRIVER]

FOR LPB MODEL
P407
12507WR-08L

LOCAL DIMMING

L/DIM_SCLK
L/DIM_MOSI
L/DIM_VS

I2C_SCL
I2C_SDA

Not used :
only for small(ready)

S7LR core 1.2V volt

IC403
TPS54319TRE

3A $ 0.165

Vout=0.827*(1+R1/R2)=1.225V

+5V_USB

2000 mA

IC401
AOZ1051PI [EPILX]

3A

Vout=0.8*(1+R1/R2)

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | GP4L_S7LR2 | DATE | 2011/11.14 |
| BLOCK | POWER_LARGE | SHEET | 4 |

IR/LED and control for normal models.

SECRET

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LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011/11/16
BLOCK	IR/CONTROL	SHEET	6

USB (SIDE)

USB1_DIODES

USB2_DIODES

SECRET
LGElectronics

LG ELECTRONICS
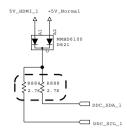
MODEL	GP4_S7LR2	DATE	10/08/13
BLOCK	USB_OCP_DIODE	SHEET	7

HDMI

HDMI_1

JK802 — BAG59Q23302

HDMI_2

JK801 — BAG59Q23302

SIDE_HDMI

JK803 — BAG62611201

SIDE_HDMI_32LS3500
51U019S-312HFN-E-R-E-LG
JK803-*1

For CEC

HDMI_CEC — R855 100 — CEC_REMOTE_S7

SECRET
LGElectronics

LG ELECTRONICS
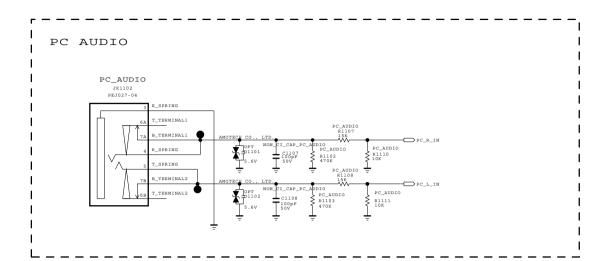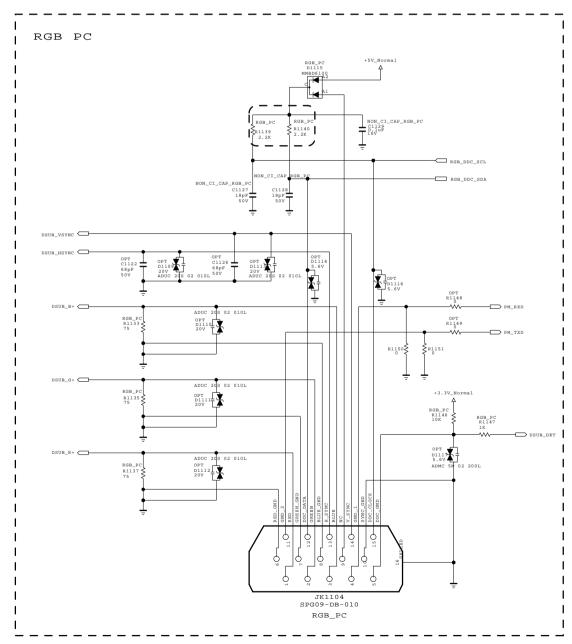
MODEL	GP4L_S7LR2	DATE	2011.10.04
BLOCK	HDMI	SHEET	8

RGB-PC / SPDIF

SPDIF OPTIC JACK

5.15 Meter Circuit Application

+3.3V_Normal

SPDIF_OPTIC
JK1103
2F01TC1-CLM97-4F

GND	1
VCC	2
VIN	3
SHIELD	4

Fiber Optic

SPDIF_OUT

OPT
R1104
10K

OPT
C1109
22uF
16V

OPT
C1110
10uF
16V

SPDIF_OPTIC
C1131
0.1uF
16V

SPDIF_OPTIC
C1121
100pF
50V

PC AUDIO

PC_AUDIO
JK1102
PKJ027-04

1	E_SPRING
6A	T_TERMINAL1
7A	R_TERMINAL1
4	R_SPRING
5	T_SPRING
7B	R_TERMINAL2
6B	T_TERMINAL2

AMOTECH CO., LTD.

OPT
D1101
5.6V

NON_CI_CAP_PC_AUDIO
C1107
100pF
50V

PC_AUDIO
R1102
470K

PC_AUDIO
R1107

PC_AUDIO
R1110
10K

PC_R_IN

AMOTECH CO., LTD.

OPT
D1102
5.6V

NON_CI_CAP_PC_AUDIO
C1108
100pF
50V

PC_AUDIO
R1103
470K

PC_AUDIO
R1108
15K

PC_AUDIO
R1111
10K

PC_L_IN

RGB PC

RGB_PC
D1115
MMBD6100

+5V_Normal

RGB_PC
R1139
2.2K

RGB_PC
R1140
2.2K

NON_CI_CAP_RGB_PC
C1129
16V

RGB_DDC_SCL

RGB_DDC_SDA

NON_CI_CAP_RGB_PC
C1127
18pF
50V

NON_CI_CAP_RGB_PC
C1128
18pF
50V

DSUB_VSYNC

DSUB_HSYNC

OPT
C1122
68pF
50V

OPT
D1109
20V
ADUC 2GS 02 010L

OPT
C1126
68pF
50V

OPT
D1113
20V
ADUC 2GS 02 010L

OPT
D1114
5.6V

OPT
D1116
5.6V

OPT
R1148

PM_RXD

DSUB_B+

RGB_PC
R1133
75

ADUC 2GS 02 010L
OPT
D1110
20V

OPT
R1149

PM_TXD

R1150
0

R1151
0

DSUB_G+

RGB_PC
R1135
75

ADUC 2GS 02 010L
OPT
D1111
20V

+3.3V_Normal

RGB_PC
R1146
10K

RGB_PC
R1147
1K

DSUB_DET

DSUB_R+

RGB_PC
R1137
75

ADUC 2GS 02 010L
OPT
D1112
20V

OPT
D1117
5.6V
ADMC 5M 02 200L

JK1104
SPG09-DB-010
RGB_PC

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011/09/27
BLOCK	RGB-PC/SPDIF	SHEET	9

RS-232C

COMMERCIAL MODEL OPTION

COMMERCIAL MODEL OPTION

+3.5V_ST

C1000
0.33uF
COMMERCIAL

COMMERCIAL
IC1000
MAX3232CDR

COMMERCIAL
C1005
0.1uF

COMMERCIAL	C1+	1	16 VCC
COMMERCIAL	V+	2	15 GND
COMMERCIAL C1001 0.1uF	C1-	3	14 DOUT1
COMMERCIAL C1002 0.1uF	C2+	4	13 RIN1
COMMERCIAL C1003 0.1uF	C2-	5	12 ROUT1
COMMERCIAL C1004 0.1uF	V-	6	11 DIN1
	DOUT2	7	10 DIN2
	RIN2	8	9 ROUT2

EAN41348201

R1003
100

R1002
100

OPT
D1000
ADUC 20S 02 010L
20V

OPT
D1001
ADUC 20S 02 010L
20V

RS-232C_IC_Bypass

R1000   R1001

RS-232C_IC_Bypass

PM_RXD

PM_TXD

COMMERCIAL

IR_OUT

M6	6	
M1	1	
M3_DETECT	3	
M4	4	
M5_GND		

KJA-PH-1-0177
JK1001

+3.5V_ST

P1000
12507WR-04L

VCC	1
PM_RXD	2
GND	3
RM_TXD	4
GND	5

**For Comsumer model,
use 4PIN Wafer.**

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011/08/13
BLOCK	RS232C_PHONE	SHEET	10

LVDS for large inch

[51Pin LVDS Connector]
(For FHD 60Hz)

FHD
P703
FI-RE51S-HF-J-R1500

LVDS_SEL
+3.3V_Normal
OPT
R705
3.3K
OPT
R710
10K

SCANNING_EN
+3.3V_Normal
OPT
R703
3.3K
OPT
R704
10K

PSU_T120_LGD
R706
0
PWM_DIM

OPC&SCANNING_CTRL

RXA4+
RXA4-
RXA3+
RXA3-
RXACK+
RXACK-
RXA2+
RXA2-
RXA1+
RXA1-
RXA0+
RXA0-

AUO_GND/LGD_NC
AUO_GND
R709
10K

RXB4+
RXB4-
RXB3+
RXB3-
RXBCK+
RXBCK-
RXB2+
RXB2-
RXB1+
RXB1-
RXB0+
RXB0-

PANEL_VCC
FHD
L702
70-ohm

OPT
C700
10uF
16V
OPT
C709
1000p
50V
FHD
C710
0.1uF
16V

FOR FHD REVERSE(10bit)
Change in S7LR

MIRROR   Pol-change

RXA4+	RXA0+	RXA0+
RXA4-	RXA0-	RXA0-
RXA3+	RXA1+	RXA1+
RXA3-	RXA1-	RXA1-
RXACK+	RXA2+	RXA2+
RXACK-	RXA2-	RXA2-
RXA2+	RXACK+	RXACK+
RXA2-	RXACK-	RXACK-
RXA1+	RXA3+	RXA3-
RXA1-	RXA3-	RXA3+
RXA0+	RXA4+	RXA4-
RXA0-	RXA4-	RXA4+

RXB4+	RXB0+	RXB0-
RXB4-	RXB0-	RXB0+
RXB3+	RXB1+	RXB1-
RXB3-	RXB1-	RXB1+
RXBCK+	RXB2+	RXB2-
RXBCK-	RXB2-	RXB2+
RXB2+	RXBCK+	RXBCK-
RXB2-	RXBCK-	RXBCK+
RXB1+	RXB3+	RXB3-
RXB1-	RXB3-	RXB3+
RXB0+	RXB4+	RXB4-
RXB0-	RXB4-	RXB4+

FOR FHD REVERSE(8bit)
Change in S7LR

MIRROR   Pol-change   Shift

RXA4+	RXA4+	RXA4-	RXA0-
RXA4-	RXA4-	RXA4+	RXA0+
RXA3+	RXA0+	RXA0-	RXA1-
RXA3-	RXA0-	RXA0+	RXA1+
RXACK+	RXA1+	RXA1-	RXA2-
RXACK-	RXA1-	RXA1+	RXA2+
RXA2+	RXA2+	RXA2-	RXACK-
RXA2-	RXA2-	RXA2+	RXACK+
RXA1+	RXACK+	RXACK-	RXA3-
RXA1-	RXACK-	RXACK+	RXA3+
RXA0+	RXA3+	RXA3-	RXA4-
RXA0-	RXA3-	RXA3+	RXA4+

RXB4+	RXB4+	RXB4-	RXB0-
RXB4-	RXB4-	RXB4+	RXB0+
RXB3+	RXB0+	RXB0-	RXB1-
RXB3-	RXB0-	RXB0+	RXB1+
RXBCK+	RXB1+	RXB1-	RXB2-
RXBCK-	RXB1-	RXB1+	RXB2+
RXB2+	RXB2+	RXB2-	RXBCK-
RXB2-	RXB2-	RXB2+	RXBCK+
RXB1+	RXBCK+	RXBCK-	RXB3-
RXB1-	RXBCK-	RXBCK+	RXB3+
RXB0+	RXB3+	RXB3-	RXB4-
RXB0-	RXB3-	RXB3+	RXB4+

[30Pin LVDS Connector]
(For HD 60Hz_Normal)

HD
P705
FF10001-30

OPT
R713
0

RXA3+
RXA3-
RXACK+
RXACK-
RXA2+
RXA2-
RXA1+
RXA1-
RXA0+
RXA0-

LVDS_SEL
+3.3V_Normal
OPT
R712
3.3K
OPT
R711
10K

PANEL_VCC
HD
L701
70-ohm
BLM18SG700TN1D

OPT
C701
10uF
16V
OPT
C702
1000pF
50V
HD
C703
0.1uF
16V

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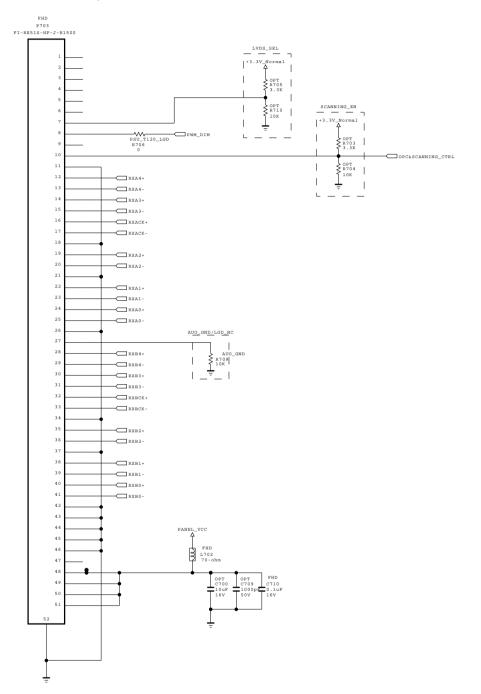THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.
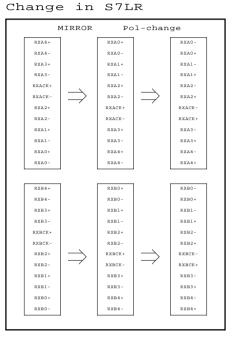
SECRET
LGElectronics

LG ELECTRONICS

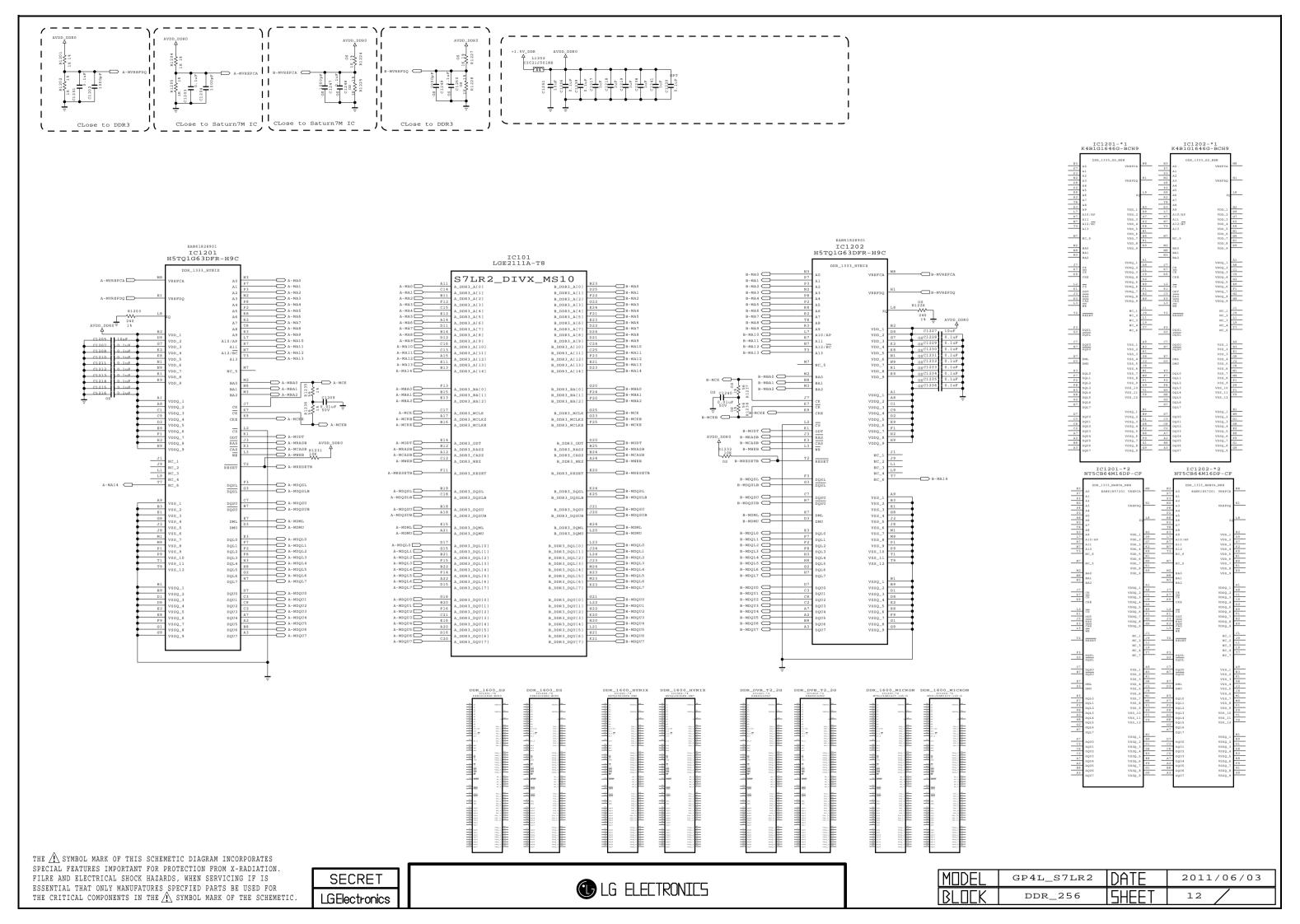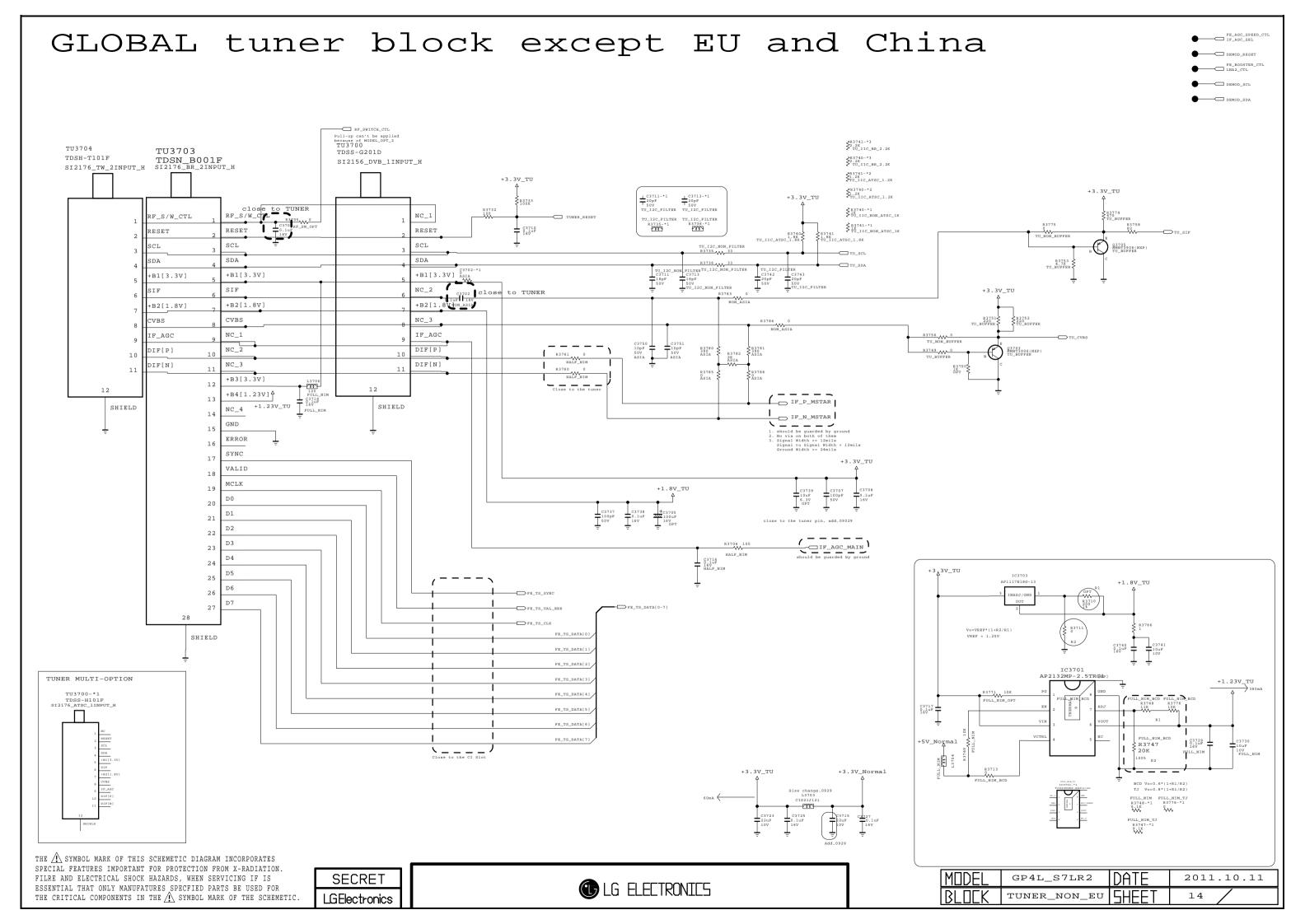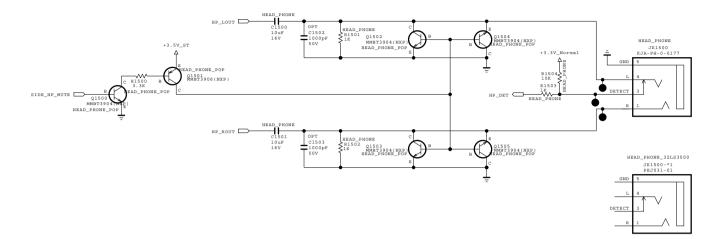| MODEL | GP4L_S7LR2 | DATE | 2011/11/14 |
| BLOCK | LVDS_LARGE | SHEET | 11 |

CLose to DDR3   CLose to Saturn7M IC   CLose to Saturn7M IC   CLose to DDR3

+1.5V_DDR   AVDD_DDR0

IC1201-*1
K4B1G1646G-BCH9

IC1202-*1
K4B1G1646G-BCH9

IC1201
H5TQ1G63DFR-H9C
DDR_1333_HYNIX

IC101
LGE2111A-T8
S7LR2_DIVX_MS10

IC1202
H5TQ1G63DFR-H9C
DDR_1333_HYNIX

IC1201-*2
NT5CB64M16DP-CF

IC1202-*2
NT5CB64M16DP-CF

DDR_1600_SS   DDR_1600_SS   DDR_1600_HYNIX   DDR_1600_HYNIX   DDR_DVB_T2_2G   DDR_DVB_T2_2G   DDR_1600_MICRON   DDR_1600_MICRON

SECRET
LGElectronics

LG ELECTRONICS

MODEL   GP4L_S7LR2   DATE   2011/06/03
BLOCK   DDR_256   SHEET   12

GLOBAL tuner block except EU and China

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011.10.11
BLOCK	TUNER_NON_EU	SHEET	14

Headphone   *Option : HEAD_PHONE

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011/10/04
BLOCK	HEADPHONE	SHEET	15

Audio amp(NTP-7500)

IC501
NTP-7500L

THERMAL 49

Pin labels (left side):
- 1 AGND_PLL
- 2 AVDD_PLL
- 3 DVDD_PLL
- 4 LF
- 5 DGND_PLL
- 6 GND_1
- 7 DGND
- 8 DVDD
- 9 SDATA
- 10 WCK
- 11 BCK
- 12 SDA

Pin labels (top): [EP] VDD_IO CLK_I GND_IO AD /RESET BST1A PGND1A OUT1A_1 OUT1A_2 PVDD1_3 PVDD1_2 PVDD1_1
48 47 46 45 44 43 42 41 40 39 38 37

Pin labels (right side):
- 36 OUT1B_2
- 35 OUT1B_1
- 34 PGND1B
- 33 BST1B
- 32 VDR1
- 31 VCC_5
- 30 AGND
- 29 VDR2
- 28 BST2A
- 27 PGND2A
- 26 OUT2A_2
- 25 OUT2A_1

Pin labels (bottom):
SCL /FAULT MONITOR0 MONITOR1 MONITOR2 BST2B PGND2B OUT2B_1 OUT2B_2 PVDD2_1 PVDD2_2 PVDD2_3
13 14 15 16 17 18 19 20 21 22 23 24

Signal labels:
AUD_LRCLH
AUD_LRCK
AUD_BCK
AMP_SDA
AMP_SCL
AMP_MUTE
POWER_DET
AMP_RESET
AUD_MASTER_CLK

+24V
+24V_AMP
+3.3V_Normal
+3.5V_ST

SPK_L+
SPK_L-
SPEAKER_L
SPK_R+
SPK_R-
SPEAKER_R

WAFER-ANGLE
P501
SPK_L+ 4
SPK_L- 3
SPK_R+ 2
SPK_R- 1

Components:
L501 CIS212121
L502 BLM18PG121SN1D
Q501 MMBT3904(NXP)
D501 1N4148W 100V OPT
D502 1N4148W 100V
D503 1N4148W 100V OPT
D504 1N4148W 100V OPT
L503 10.0uH
L504 10.0uH
L505 10.0uH
L506 10.0uH

NON_LIPS
LIPS_ONLY

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | GP4L_S7LR2 | DATE | 2011.10.04 |
| BLOCK | NTP-7500 | SHEET | 16 |

COMPONENT1 & AV(COMMON), COMPONENT2

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011.11.02
BLOCK	REAR_NON_EU_L	SHEET	17

ETHERNET

* H/W option : ETHERNET

+2.5V_Normal

ETHERNET
L3707
BLM18PG121SN1D

JK2100-*1
BS-R430051

JK2100
XRJV-01V-0-D12-080

ETHERNET_UDE

ETHERNET_XMULTIPLE

OPT
D2105
5.5V
ADLC 5S 02 015

EPHY_TP

EPHY_TN

EPHY_RP

OPT
D2103
5.5V
ADLC 5S 02 015

OPT
D2104
5.5V
ADLC 5S 02 015

EPHY_RN

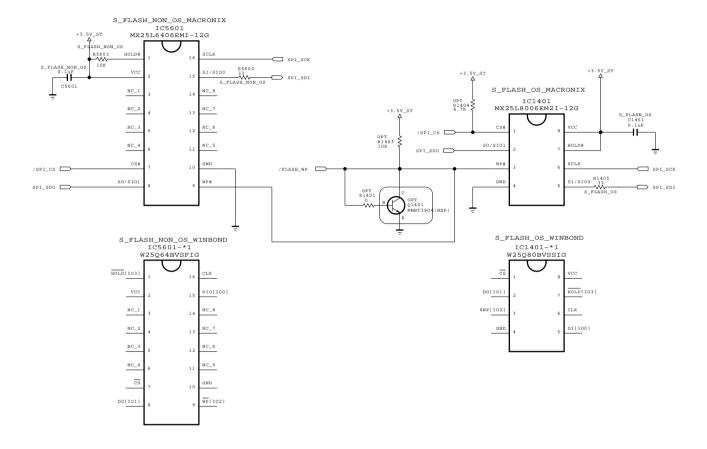OPT
D2101
5.5V
ADLC 5S 02 015

ETHERNET
C2104
0.01uF
50V

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SECRET

LGElectronics

LG LG ELECTRONICS

MODEL	GP4L_S7LR2	DATE	2011/06/14
BLOCK	ETHERNET	SHEET	21 /

Serial Flash for SPI boot_NON_OS and OS

S_FLASH_NON_OS_MACRONIX
IC5601
MX25L6406EMI-12G

+3.5V_ST
S_FLASH_NON_OS
R5603 10K

S_FLASH_NON_OS 0.1uF
C5601

Pin	Name		Name	Pin
1	HOLD#	SCLK	16
2	VCC	SI/SIO0	15
3	NC_1	NC_8	14
4	NC_2	NC_7	13
5	NC_3	NC_6	12
6	NC_4	NC_5	11
7	CS#	GND	10
8	SO/SIO1	WP#	9

SPI_SCK
R5602 S_FLASH_NON_OS SPI_SDI
/SPI_CS
SPI_SDO

S_FLASH_OS_MACRONIX
IC1401
MX25L8006EM2I-12G

+3.5V_ST
OPT R1404 4.7K
+3.5V_ST
S_FLASH_OS C1401 0.1uF

+3.5V_ST
OPT R1403 10K

/SPI_CS
SPI_SDO

Pin	Name		Name	Pin
1	CS#	VCC	8
2	SO/SIO1	HOLD#	7
3	WP#	SCLK	6
4	GND	SI/SIO0	5

SPI_SCK
R1405 S_FLASH_OS SPI_SDI

/FLASH_WP
OPT R1401 0
OPT Q1401 MMBT3904(NXP)

S_FLASH_NON_OS_WINBOND
IC5601-*1
W25Q64BVSFIG

Pin	Name		Name	Pin
1	HOLD[IO3]	CLK	16
2	VCC	DIO[IO0]	15
3	NC_1	NC_8	14
4	NC_2	NC_7	13
5	NC_3	NC_6	12
6	NC_4	NC_5	11
7	CS	GND	10
8	DO[IO1]	WP[IO2]	9

S_FLASH_OS_WINBOND
IC1401-*1
W25Q80BVSSIG

Pin	Name		Name	Pin
1	CS	VCC	8
2	DO[IO1]	HOLD[IO3]	7
3	%WP[IO2]	CLK	6
4	GND	DI[IO0]	5

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP4L_S7LR	DATE	2011.08.29
BLOCK	Serial FLASH	SHEET	56

MSTART DEBUG_4PIN

P1
1250SWS-04A00

MSTAR_DEBUG_4P

RGB_DDC_SCL

RGB_DDC_SDA

SECRET

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MODEL	GP4L_S7LR2	DATE	2011/09/05
BLOCK	MSTAR DEBUG_4PIN	SHEET	58

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